

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Harmeet Bhugra et al.

Serial No.: 10/688,353

Filed: October 17, 2003

For: CAM-BASED SEARCH ENGINES THAT SUPPORT PIPELINED MULTI-DATABASE  
SEARCH OPERATIONS USING REPLACEMENT SEARCH KEY SEGMENTS

Group Art Unit: 2187

Examiner: Brian R. Peugh

Confirmation No.: 2287

Date: May 31, 2006

Mail Stop 16

Director of the U.S. Patent and Trademark Office

P.O. Box 1450

Alexandria, VA 22313

**REQUEST FOR REFUND OF FEES  
UNDER 37 C.F.R. §1.26 AND 37 C.F.R. §1.28(a)**

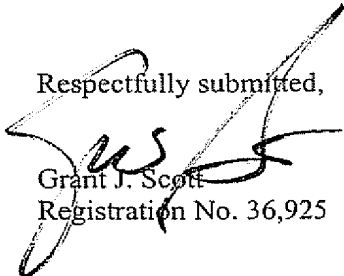
Sir:

Applicants respectfully submit this Request for Refund of Fees pursuant to 37 C.F.R. §1.26 in the amount of \$180.00. On May 8, 2006, Applicants filed an Amendment, which included copies of Acknowledgement Receipts and Electronic Information Disclosure Statements (IDSs) filed electronically with the U.S. Patent and Trademark Office on March 5, 2004 and February 2, 2005 (Appendix A).

As noted on the Deposit Account Statement on May 18, 2006 (Appendix B), the USPTO charged Deposit Account Number 50-0220 in the amount of \$180.00 for fees associated with the submission of an Information Disclosure Statement. However, copies of these previously filed IDSs (attached to our Amendment of May 8, 2006), were provided as a convenience to the Examiner for consideration of the references cited and return of the initialed Electronic Information Disclosure Statements.

Accordingly, no fee is believed to be due. Applicants respectfully submit that the fee of \$180.00 was erroneously charged and requests a refund in the amount of **\$180.00** to Deposit Account No. **50-0220**.

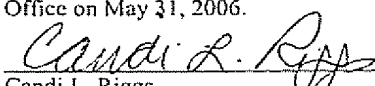
Respectfully submitted,

  
Grant J. Scott  
Registration No. 36,925

USPTO Customer No. 20792  
Myers Bigel Sibley & Sajovec, P.A.  
Post Office Box 37428  
Raleigh, North Carolina 27627  
Telephone: (919) 854-1400  
Facsimile: (919) 854-1401

**CERTIFICATION OF ELECTRONIC TRANSMISSION**

I hereby certify that this correspondence is being transmitted electronically to the U.S. Patent and Trademark Office on May 31, 2006.

  
Candi L. Riggs

## **APPENDIX A**

GJS:clr

5646-115  
May 9, 2006

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir: Kindly acknowledge receipt of the accompanying by placing your  
receiving date stamp hereon and mailing:

Amendment A; In re: Bhugra et al.; Serial No. 10/688,353; Filed October 17, 2003;  
For: CAM-BASED SEARCH ENGINES THAT SUPPORT PIPELINED MULTI-  
DATABASE SEARCH OPERATIONS USING REPLACEMENT SEARCH KEY  
SEGMENTS

Respectfully submitted,  
MYERS BIGEL SIBLEY & SAJOVEC

05-159959P939

GJS:clr

5646-115  
May 9, 2006

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450



Sir: Kindly acknowledge receipt of the accompanying by placing your  
receiving date stamp hereon and mailing:

Amendment A; In re: Bhugra et al.; Serial No. 10/688,353; Filed October 17, 2003;  
For: CAM-BASED SEARCH ENGINES THAT SUPPORT PIPELINED MULTI-  
DATABASE SEARCH OPERATIONS USING REPLACEMENT SEARCH KEY  
SEGMENTS

Respectfully submitted,  
MYERS BIGEL SIBLEY & SAJOVEC

A handwritten signature in black ink, appearing to be 'MBS' or similar, located at the bottom right of the page.

Attorney Docket No. 5646-115

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Bhugra et al.  
Serial No. 10/688,353  
Filed: October 17, 2003

Confirmation No. 2287  
Group Art Unit: 2187  
Examiner: Brian R. Peugh

For: **CAM-BASED SEARCH ENGINES THAT SUPPORT PIPELINED  
MULTI-DATABASE SEARCH OPERATIONS USING REPLACEMENT  
SEARCH KEY SEGMENTS**

May 9, 2006

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1451

**AMENDMENT A**

Sir:

This response addresses the Official Action of May 1, 2006.

In the Claims:

1. (Currently amended) An integrated circuit device, comprising:  
a search engine that supports ~~is configured to support~~ a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core using a corresponding plurality of search keys, said plurality of search keys comprising:  
a first search key that requires at least one data cycle to load into said search engine before a first search of a first one of the plurality of databases is performed using a first search word derived from the first search key; and  
a second search key that comprises a replacement search key segment and at least one search key segment from the first search key.
2. (Original) The device of Claim 1, wherein the plurality of consecutive search operations comprises a second search of a second one of the plurality of databases using a second search word derived from the second search key.
3. (Original) The device of Claim 2, wherein the second search key is shorter than the first search key.
4. (Original) The device of Claim 2, wherein none of the plurality of search keys is longer than the first search key.
5. (Original) The device of Claim 2, wherein the replacement search key segment requires one data cycle to load into said search engine.

6. (Original) The device of Claim 5, wherein the plurality of search keys comprise a third search key that comprises another replacement search key segment and at least one search key segment from the first search key; wherein the another replacement search key segment requires one data cycle to load into said search engine; and wherein the another replacement search key segment is loaded into said search engine after the replacement search key segment is loaded into said search engine.

7. (Original) The device of Claim 6, wherein the replacement search key segment and the another replacement search key segment have equivalent values.

8. (Original) The device of Claim 7, wherein the plurality of consecutive search operations comprises a third search of a third one of the plurality of databases using a third search word derived from the third search key; and wherein the second and third search words are different.

9. (Currently amended) The device of Claim 2, wherein the first search key requires multiple data cycles to load into said search engine; and wherein the replacement search key segment requires fewer than the multiple data cycles to load into said search engine.

10. (Currently amended) An integrated circuit device, comprising:  
a search engine that supports ~~is configured to support~~ a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core using a corresponding plurality of search keys, said plurality of search keys comprising:

a first search key that requires at least one data cycle to load into said search engine before a search of a first of the plurality of databases is performed using a search word that is derived from the first search key;  
and

a second search key that comprises at least one search key segment from the first search key and another search key segment that is loaded into said search engine after the first search key.

11. (Original) The device of Claim 10, wherein the plurality of consecutive search operations comprises a second search of a second one of the plurality of databases using a second search word derived from the second search key.

12. (Original) The device of Claim 11, wherein the second search key is longer than the first search key.

13. (Original) The device of Claim 11, wherein the another search key segment requires one data cycle to load into said search engine.

14. (Currently amended) An integrated circuit device, comprising:  
a search engine that supports ~~is configured to support~~ a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core, using a corresponding plurality of search keys that include a longest first search key that requires multiple cycles to load into said search engine before a search of a first of the plurality of databases is performed and at least one shortest search key that requires fewer than the multiple cycles to load into said search engine and comprises a replacement search key segment and at least one search key segment derived from the longest first search key.

15. (Currently amended) An integrated circuit device, comprising:  
a search engine that supports ~~is configured to support~~ a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core using a corresponding plurality of search keys, said plurality of search keys comprising:

a first search key that requires multiple data cycles to load into said search engine before a first search of a first one of the plurality of databases is performed;

a second search key that comprises a first replacement search key segment and at least a first search key segment derived from the first search key; and

a third search key that comprises a second replacement search key segment and at least a second search key segment derived from the first search key.

16. (Currently amended) The device of Claim 15, wherein the first search key segment ~~from the first search key~~ and the second search key segment ~~from the first search key~~ are equivalent search key segments.

17. (Original) The device of Claim 15, wherein the first replacement search key segment requires only one data cycle to load into said search engine.



18. (Original) The device of Claim 17, wherein the second replacement search key segment is loaded into said search engine after the first replacement search key is loaded into said search engine.

Claims 19-25 (Canceled).

26. (New) A method of operating a search engine device, comprising the steps of:

searching one or more databases within the search engine device using a first search key that takes multiple data cycles to load into the search engine device; and then

searching one or more databases within the search engine device using a second search key that is unequal to the first search key and comprises a search key segment from the first search key and a replacement search key segment that is loaded into the search engine device after the first search key has been loaded into the search engine device.

27. (New) The method of Claim 26, wherein the replacement search key segment requires one data cycle to load into the search engine device.

#### REMARKS

Applicants appreciate the examination of the application that is evidenced by the Official Action of May 1, 2006. In response, Applicants have amended Claims 1, 9-10 and 14-15 to address the section 112 issues raised by the Examiner. Claims 26-27 have also been added.

However, Claim 17 has not been amended because the distinction between the "replacement search key segment" and the "first search key" is correctly recited. As described throughout the application, according to an embodiment of the invention, the "first search key", which typically comprises multiple search key segments, requires multiple data cycles to load into the search engine (because it is a full-length key (see, e.g., FIGS. 6A-6C and page 17, 1<sup>st</sup> paragraph)), but the replacement search key segment may require only a single data cycle to load into the search engine:

In order to prevent the CAM interface from being a bottleneck to system performance, the plurality of databases within the CAM core 54 may be searched using variations of a primary search key. Thus, it becomes unnecessary to repeatedly load the entire contents of each search key across the CAM interface for each search operation within a respective database. Instead, during the fourth through tenth cycles illustrated by FIG. 6A, the shorter replacement search key segments associated with the second through eighth search operations may be loaded into the search engine 50. These replacement search key segments, which are illustrated as REPLACEMENT KEY SEGMENTS 0-6, may be combined with one or more segments of the primary search key (or other search key) to define a desired search key for a respective search operation. This search key may constitute a search word (i.e., comparand) that is applied to a database within the CAM core or, more typically, the search key may be modified by a global mask stored within the search engine. Moreover, whereas FIG. 6A illustrates that a respective single cycle may be required to receive the multi-database search instruction and to receive each of the search key segments, alternative embodiments may use a fewer or larger number of cycles depending on the bandwidth requirements and capabilities of a particular system. ('353 application, page 17, underline added).

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Serial No. 10/688,353  
Filed: October 17, 2003  
Page 8

In view of the above claim amendments and explanation of Claim 17, Applicants respectfully submit that all claims are now in condition for allowance.

Applicants also note that the Office Action does not indicate consideration of Applicant's Information Disclosure Statements (IDSs) submitted electronically on March 5, 2004 and February 2, 2005, copies of which are attached, along with a copy of the acknowledgment receipts. Applicants respectfully request consideration of the references cited in the IDSs and return of copies of the initialed forms PTO-1449 indicating such consideration.

The Examiner is encouraged to contact the undersigned by telephone at 919-854-1407 in the event any issues remain which may prevent issuance of the present application.

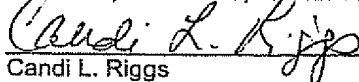
Respectfully submitted,

  
Grant J. Scott  
Registration No. 36,925

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Myers Bigel Sibley & Sajovec  
Post Office Box 37428  
Raleigh, North Carolina 27627  
Telephone: 919/854-1400  
Facsimile: 919/854-1401

**CERTIFICATION OF MAILING**

I hereby certify that this correspondence is being deposited with the U.S. Patent and Trademark Office as first-class mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on May 9, 2006..

  
Candi L. Riggs

UNITED STATES PATENT AND TRADEMARK OFFICE  
ACKNOWLEDGEMENT RECEIPT

Electronic Version 1.1  
Stylesheet Version v1.1.1

Title of Invention

CAM-Based Search Engines that Support Pipelined Multi-Database Search Operations Using Replacement Search Key Segments

Submission Type: Information Disclosure Statement

Application Number: 10/688353

\*10/688353\*

EFS ID: 56619

Server Response:

Confirmation Code	Message
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ISYS5	Filename= N/A BusinessRule= Validation System/Function Call Information. #Supporting Msg:Server unable to validate the Confirmation/Application numbers at this time. They will be checked by PTO personnel later.

First Named Applicant: Harmeet Bhugra

Attorney Docket Number: 5646-115

Timestamp: 2004-03-05 11:05:32 EDT

From: us

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Total files size		68927

Message Digest: 3fdf30e7acb88769412ea3f9ca0b8f93c1a061bc

Digital Certificate Holder Name: cn=Grant J. Scott,ou=Registered Attorneys,ou=Patent and Trademark Office,ou=Department of Commerce,o=U.S. Government,c=US



# ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18  
Worksheet Version v18.0

## Title of Invention

CAM-Based Search Engines that Support Pipelined Multi-Database Search Operations Using Replacement Search Key Segments

Application Number: 10/688353 \*10/688353\*  
Confirmation Number: 2287  
First Named Applicant: Harmeet Bhugra  
Attorney Docket Number: 5646-115  
Art Unit: 2818  
Search string: ( 6374326 ).pn.

## US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

Init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
	1	6374326	2002-04-16	Kansal et al.	B1	711	108

## Signature

Examiner Name	Date

UNITED STATES PATENT AND TRADEMARK OFFICE  
ACKNOWLEDGEMENT RECEIPT

Electronic Version 1.1  
Worksheet Version v1.1.1

Title of Invention

CAM-Based Search Engines that Support Pipelined Multi-Database Search  
Operations Using Replacement Search Key Segments

Submission Type: Information Disclosure Statement

Application Number: 10/688353

\*10/688353\*

EFS ID: 77277

Server Response:

Confirmation Code	Message
ISVR1	Submission was successfully submitted - Even if Informational or Warning Messages appear below, please do not resubmit this application
ICON1	2287
USPTOEFSNotice	For assistance with e-filing a patent application, contact the Patent Electronic Business Center: Toll-Free Number:1(866) 217-9197 Website: <a href="http://www.uspto.gov/ebc/">http://www.uspto.gov/ebc/</a>

First Named Applicant: Harmeet Bhugra

Attorney Docket Number: 5646-115

Timestamp: 2005-02-02 15:13:33 EDT

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Digital Certificate Holder Name: cn=Grant J. Scott,ou=Registered Attorneys,ou=Patent and Trademark Office,ou=Department of Commerce,o=U.S. Government,c=US

# ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18

Worksheet Version v18.0

## Title of Invention

CAM-Based Search Engines that Support Pipelined Multi-Database Search Operations Using Replacement Search Key Segments

Application Number: 10/688353 \*10/688353\*

Confirmation Number: 2287

First Named Applicant: Harmeet Bhugra

Attorney Docket Number: 5646-115

Art Unit: 2818

Search string: ( 6763426 ).pn.

## US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
	1	6763426	2004-07-13	James et al.	B1	711	108

## Signature

Examiner Name

Date

## **APPENDIX B**



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